

34. Critical naturalism for the human sciences

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1. Naturalism descends on the human sciences

Naturalism is a central issue in philosophy, and has been for the longest time, albeit with widely different construals, linked to widely different contexts. But it has come to the fore in the last half-century or so for a reason: the heretofore non-naturalist majority opinion came under attack from two sides. On one side were philosophers armed with conceptual analyses purporting to show that what came to be known as scientific naturalism is the correct position, whether as an ontological or an epistemological doctrine. On the other were formal and empirical scientists with a scientific research agenda aiming at uncovering natural processes and states of affairs to which, one by one, the tenets of non-natural understanding, whether lay or scientific, could be identified, on pain of being altogether eliminated.

The two campaigns were roughly convergent, if not fully coordinated, and provided each other mutual support. They shared a common spirit as well as certain intellectual ancestors. It could almost seem, from a distance, as if philosophy was the legislative body and this *scienza nuova* its executive branch. But as some reflection, in the light of some experience, has shown, this picture was flawed. The conceptual plea for naturalism, in itself, was—and remains—free-floating, leaving so many options undecided that a plethora of world-views and conversations proliferate under the banner of scientific naturalism: as a whole, this philosophical movement is what Putnam calls a I-know-not-what. By contrast, the scientific research program, which I will henceforth identify, at the cost of some simplification, with cognitive science, is anchored in a set of structuring hypotheses regarding the natural realm and the sense in which recalcitrant entities can be repatriated to—or ‘placed’ in—that realm. As these hypotheses evolve, and placement results begin to accumulate, a clearer picture of what scientific naturalism amounts to emerges, as a (provisional and partial) end-result, rather than an a priori standard to which science should abide¹.

¹ A philosopher who defends scientific naturalism can do so while heavily leaning on, and even contributing to the naturalization project. David Papineau is a case in point: see Papineau (1993, 2002).

The human sciences (both those centered on the individual and those tending to society) have been at the forefront of the naturalism debate. As is well known, they have been seen, by a majority of their practitioners and philosophical defenders, as fundamentally differing from the natural sciences, and thus at once challenging ontological naturalism and constituting a living rebuttal of epistemological naturalism. No wonder then that the recent naturalistic wave has descended on the human sciences with a vengeance. Like waves breaking on the shore, this one upsets its target's balance in two ways: it first hits it on the head, and then tows it from under. First, naturalism attempts to delegitimize the human sciences by questioning their basic ontological tenets: on what grounds can they help themselves to such concepts as mind, thought, meaning, consciousness, self, abstract objects, norms, culture, practices, language, symbol, history, class, representation, order, power, etc., which are not observable and don't seem to exert any well-identified causal effect on the world, notwithstanding what our commonsense parlance, contaminated by these human sciences, may suggest? Second, cognitive science (again, broadly construed), claims to provide *bona fide* scientific accounts that supersede the received human-scientific ones. This destabilizing strategy is all the more effective as naturalistic methods in the human sciences can prevail themselves of the proven success of the natural sciences. To be sure, they are deployed on a novel terrain, and thus stretched beyond their original perimeter of competence. But the same happened when the natural science of living matter developed, gradually, into present-day biology: the case of a Grand Division between the sciences of inert matter —physics and inorganic chemistry— and the sciences of living organisms did not hold for very long². Whenever a new method was proposed, it was critically examined and tested, and only after it had been shown to be sufficiently in line with existing proven methods, and able to provide reliable, cumulative knowledge that meshed with previously acquired results, was it admitted into the club of natural scientific methods.

The same is happening under our own eyes with cognitive science *qua* naturalistic human science. So that, instead of just claiming that human entities *must* be naturalized, on conceptual grounds, the new science is actually attempting to show how it can be done. Henri Poincaré, who was similarly concerned with the unity of nature, put it succinctly: “The

² This is admittedly a crude oversimplification. Chemistry itself was once divided into two branches, inorganic and organic, that were deemed essentially different, until the synthesis of urea by Friedrich Wöhler in 1828 established an ontological bridge between them. Biology did not appear as clearly continuous with the physical sciences before the mid 20th century.

question we must ask is not whether nature is one, but *how* it is one.”³. In other words, the question for physicists in the 19th century who worried about the ‘imponderable fluids’ such as caloric, phlogiston, etc., was not, Can we reduce or eliminate them? but rather, How do we do it?

In the case of human phenomena, the ongoing efforts split into two projects. One is to naturalize the mind: to show that it is part of nature, that all things mental are natural states, processes or events. The second project aims at producing a naturalistic social science. While these are distinct projects for the obvious reason that their targets are distinct, they are related in two ways. First, although not analytically wedded to methodological individualism, cognitive science requires at least some principle of individual transmission⁴: social forces, whatever they are, require the vehicles of individual minds —not necessarily in conscious, explicit mode— in order to impinge on the world. Second, a crucial recent development in cognitive science proceeds from the insight that biological evolution has provided the human mind with very specific social skills: ours is a ‘social brain’, so that human society and human cognitive capacities end up like lock and key as a result of a co-evolutionary process.

Let us then first remind ourselves of how cognitive science approaches the individual mind. The theoretical background is provided by the extraordinarily novel configuration of biology fashioned by the formal sciences in the course of the 20th century. It made not only intelligible but highly productive, from the 1960s onward, the concept of the mind as a physically instantiated computational device operating on representations. This model of the fully-formed mind typical of the adult *Homo sapiens*, was considerably enriched, both conceptually and empirically, by developmental psychology, as well as by the study of non-normal or non-typical minds and non-human cognition. Then came the enlargement of the initial agenda, consisting of such functions as reasoning, memory, language, perception, motor control, to emotions, consciousness, self, character (along with interindividual differences, heretofore deliberately ignored), social skills. Finally (in a sense both logical and, to some extent at least, chronological), biology staged a spectacular return, wielding three distinct though intimately related research programs: neuroscience, buttressed by functional neuro-imaging and computational modeling, genetics, evolutionary theory. The long-term outcome of this monumental undertaking is a three-fold account of the mind as a highly complex information-processing system, of the brain as the equally complex biological

³ Poincaré (1902), chap. IX; my italics.

⁴ See e.g. Nelson (1990).

system that undergirds or enables the mind, and of the cognitive organ shaped by evolution, both as a system of mental functions (the ‘evolved mind’) and as a system of neural functions (the ‘evolved brain’).

Filling out this very rough sketch cannot be attempted here, and a critical outlook will be deployed shortly. But it may be worth emphasizing at this point that underestimating the force and impact of these developments would be a mistake at least as serious, and probably more, as overestimating them. The plausibility of any form of naturalism today cannot be gauged in the absence of an informed perspective on the ongoing naturalization programs, which includes taking them seriously. Liberal naturalists who are content with acknowledging their existence without reflecting on their output may be naturalists only in name.

Let us now turn to the social sphere. At the outset a misunderstanding threatens, which must be defused: in some traditions, any phenomenon that involves social processes is *by definition* not natural. This is unhelpful: there are non-human social species giving rise to social phenomena that are natural in the most widely accepted sense of the word (non-human animals are part of nature through and through, even if we wish to distinguish different strata within the non-human animal world, accepting for example the notion of animal culture). We must ask therefore, regardless of our stand on naturalism, which among the social processes in human societies are natural in a sense shared with non-human societies, and which are not, and of these, what, if anything, makes them non-natural. In fact, the current naturalistic approaches support the idea that the natural constitution of human individuals is intimately linked to the specific character of human society. At any rate, it is advisable not to let a premature terminological choice obscure the inquiry.

How does the naturalization of the social sphere proceed? Several approaches are explored, in interconnected ways. The first is the most abstract and removed from mainstream empirical work in the social sciences: society is viewed as a complex network of interacting agents who are, for all practical purposes, information processors that harbor beliefs and preferences under uncertainty. Powerful analytic tools—sophisticated versions of decision theory, game theory and dynamical systems—provide elaborate and enlightening accounts of social, political and economic phenomena. Of particular interest in the present context is the treatment of norms, which are not limited to the maximization of individual utility and include a plurality of ‘other-regarding’ norms. They are shown to emerge, first, as a result of

gene-culture co-evolutionary processes leading to *Homo sapiens*, and subsequently, in social and cultural evolution, as coordinating devices⁵.

The second approach is closer to a lot of present-day social science, to which it aims at contributing a better—more detailed and realistic—model of the individual agent. The simple model of the utility-maximizing agent in economics, or the more elaborate models used in social psychology or political science, have turned out to be deficient. The strategy of abstracting away from individual differences and imperfect performance, in the hope that deviations cancel out, ceases to be an acceptable wager in a naturalistic perspective, both because it leads to poor results and because better models have become available. Cognitive science purports to substitute genuine empirical knowledge for fanciful, armchair or introspective speculations regarding such essential processes and faculties as memory, learning, reasoning, linguistic communication, and above all decision-making. Behavior that could only be characterized in the traditional framework as irrational, can now be accounted for and seen as rational in its own right. Predictions improve, and in some cases policy can be oriented towards better overall outcomes.

The third approach concerns the genesis of social phenomena, which are purported to result from two distinct processes: biological evolution and cultural evolution. The first throws light on the gene-based endowment of modern humans, with the all-important feature, mentioned earlier, that an essential part of that endowment determines basic features of human natural sociality. Cultural evolution is concerned with the emergence of particular social patterns, a highly complex process involving a combination of construction, through learning and imitation, of environmental constraints, and of selection according to a generalized Darwinian dynamics. Notable examples of what this approach can bring include accounts of two of the most important and seemingly paradoxical features of '*Homo socialis*': humans are essentially co-operative, despite the advantages of free-riding; and they can collectively adapt to an extremely wide variety of environments, despite the advantages of being optimally adapted to a given niche.

The preceding remarks constitute no more than an exceedingly schematic and partial sketch. They are not meant as a defense of naturalistic approaches in the human sciences. They merely aim at conveying a sense of the field and the reasons for taking it seriously, *Verstehen* and other traditional worries notwithstanding.

⁵ See, e.g. Gintis (2009).

2. *Fluctuat Nec Mergitur*⁶: The human sciences still stand

Indeed, it may be asked, why should anyone want to resist the naturalistic pull? Naturalism appears to be progressive and fecund, it seems to be the only truly scientific game in town, and it does not obviously require giving up all of one's former theoretical commitments. The first task, though, is to ascertain whether this is indeed the case. The second is to question the unstated assumption that naturalism itself, as deployed in the above-mentioned research programs, meets with uniform success. The third is to challenge the claim to exclusive scientific privilege. It will then be possible to strike a reasonable, albeit provisional, balance between acceptance and rejection.

To start with, little if anything has been said of how naturalistic approaches propose to dispose of the theoretical posits and the empirical results of the human sciences—a key question raised by every episode in the age-old history of naturalism, but one whose stakes have risen considerably, in proportion with the growth of science on both sides: the human sciences and the naturalistic program centered on cognitive science. Today's scholars differ widely on the issue. At stake are different kinds of things: entities, like belief, social class, the market, public opinion, incentives...; properties, like mental capacities such as linguistic competence or consciousness, or social phenomena such as institutions or inflation; purported or real facts, such as young children's capacity to master any first language, or liberal economies' ability to fix prices optimally. Among them, many appear as composites of more basic components, where the composition seems tractable in a naturalistic setting. What the naturalist is left with are some hard cases.

Her options are: eliminate, reduce, identify. Elimination is rarely final, reduction, in practice, rarely perfect, though often informative. Identification is left as the strategy of choice, but runs into problems as well. In its strong form, which bears on kinds (as when water is identified with H₂O, temperature with mean kinetic energy, lightning with electric discharge in a certain setting), it often—though not always—runs into a form of the open question argument: one is left wondering whether the target kind is truly the same as the candidate natural kind. The weak form of identification, supervenience, may offer some ontological comfort but little scientific guidance.

So what is the naturalist to do with recalcitrant entities? What is not opened to her, as stated earlier, is to accept anything in her ontology without ascertaining, at least in principle,

⁶ “Tossed by the waves, she doesn't sink”: the motto of the city of Paris.

its natural status, as granted by the best current natural-scientific theories. By the same token, any theoretical account, explanation or prediction must be shown to be at least compatible with naturalistic constraints. However, she may also hold off, like a customs officer awaiting instructions. She need not respond here and now to the pressure that the non-naturalist social scientist exerts by merely resorting to one or another concept.

This prudent attitude is a first step that the naturalist can take: she shows her interlocutor in the social-scientific mainstream some tolerance, asking only some tolerance in return. More importantly, she makes way for a somewhat liberal understanding of her own commitment. But more is needed to persuade her to actually broaden her perspective and instead of merely withholding judgment, acquiesce to something a strict naturalist would reject. Three considerations may nudge her in that direction.

First, she may choose to take stock of the lack of progress in the naturalization of a number of key entities, such as, among the more prominent, intentionality, consciousness, normativity (the last of which I will return to in the final section). Lack of progress is of course a matter of judgment. Yet one cannot help but notice the sharp contrast between these recalcitrant entities and others that give rise to concomitant conceptual and empirical fairly rapid progress. Philosophical reflection on consciousness, to take one example, becomes increasingly arcane, while science produces non-cumulative, non-convergent bodies of evidence only weakly supporting a plurality of theories. The situation for visual perception is diametrically opposite. This leads no naturalist of any persuasion to conclude that consciousness partakes of the supernatural; but some may want to question the ability of natural science as we know it to provide a satisfactory account of consciousness, or even to articulate a coherent research program aiming at covering it fully.

That naturalism in the ‘strong’ sense of cognitive science and allied disciplines is ‘the only (natural-scientific) game in town’ is the second assumption which our naturalist may want to reconsider, especially with respect to social science. After all, formal and quantitative methods have been part and parcel of economics, sociology, political science, demography, history, geography, ethnography... for decades, and have co-existed, more or less peacefully, with descriptive, idiographic, narrative, interpretative branches of the same disciplines. And these formal and quantitative methods are not naturalistic in the strong sense; in fact, they can be and often are precisely agnostic about the mechanisms that realize the behaviors they measure and model, and arose in a distinctly anti-naturalistic moment in philosophy and human science. At the same time, they are compatible with strong naturalism, as the first direction outlined at the end of the preceding section (the ‘Gintis’ orientation) shows. And

they share with the natural sciences the essential features that are supposed to set these apart from the human sciences.

Yet a third consideration might be that the ‘strong’ naturalistic programs are themselves hybrid affairs, from which all non-natural concepts have not been purged: cognitive psychology and neuroscience, evolutionary anthropology, generative linguistics cannot forego intentionality, whose full naturalization remains on the agenda, as we just reminded ourselves.

Our open-minded naturalist has reached the shores of relaxed naturalism, the mildest form of liberal naturalism. She remains convinced that every step towards some form or other of naturalization contributes to our understanding, not least because it often tells us *how* to naturalize this or that, and sometimes shows that it can be done in several ways rather than just one. Insofar as her training permits it, she is happy to devote herself fully to the task. She no longer believes that science is neatly divided into two separate branches, she clearly sees that the distance between two areas within any one of them can be greater than that between areas in different branches. She is excited to see different perspectives brought in harmonious articulation as a result of a discovery or a leap of scientific imagination; but she is not worried about the persistence of heterogeneous views on the same set of phenomena: she has come to espouse scientific pluralism. Nor does she feel that the human sciences must either disappear or renounce non-naturalistic concepts and methods altogether. Naturalism comes in degrees, and the human sciences, shaken by the wave, are holding up⁷.

3. Can we make liberal naturalism more productive?

In fact, the human sciences are becoming stronger and more relevant to social, economic, political issues, and naturalism has a lot to do with it. It serves them in two distinct ways. The first is delivered, so to speak, by its ‘short arm’, one that provides, in a constructive manner, ideas, concepts, methods, sometimes important results. This contribution is all the more consequential as it is offered in a liberal spirit: a naturalist who has and shows due respect for what the human sciences have accumulated over the years in terms of insights, observations, conceptual frameworks, will have a better chance of being heard by scholars not or not yet inclined to take the naturalistic turn, and of presenting her own ideas in a way intelligible to them.

⁷ For a systematic exposition of this perspective, see Macarthur (2010).

The second impact, delivered by naturalism's 'long arm', is not so gentle. It challenges the human sciences' accounts, either by questioning their conceptual foundations, or by proposing alternatives, or again by demanding evidence—more precisely, by raising the relative weight of evidence among the criteria for assessing a given theory or framework. This critical function can nudge the human sciences towards a greater concern for accountability, and in particular overcome their perennial 'toothbrush problem': major theorists will only use their own theory, and use it as the measure of all things, making cumulative knowledge difficult if not impossible to achieve.

But there is an equally important target for the naturalist's critical proclivity, that is, naturalism itself. One thing is to broaden the scope of naturalism so as to make it hospitable to a wider set of entities and methods, at least on a provisional basis. Another is to tighten the criteria for accepting a theory hatched within naturalism, and resist the temptation of judging it true or plausible just because, if true, it would vindicate naturalism, or because it appears as the only naturalistic theory on the market, and thus, however dubious, preferable to any non-naturalist account. One might think this an unnecessary, and indeed somewhat insulting counsel: why suspect naturalism of susceptibility to such biases? One reason is the confirmation bias to which we are all prone. But another is the existence of a militant streak within scientific naturalism, one which takes the vindication of naturalism as a theory to be the naturalist's moral duty⁸.

However it be, naturalism earns its right to criticize non-naturalist approaches in the human sciences, and more generally to take part in the conversation, only insofar as it applies to itself the full force of critical thinking, as deployed in the sciences and in philosophy, and not restricting its analytic means to those already certified by strict naturalism. By allowing naturalism to step, for these methodological reasons, outside of its strict, programmatic boundaries, it becomes more than just liberal, it becomes critical and self-critical. It also coheres better to the fundamental inspiration of naturalism in its widest construal, *viz.* to scrutinize with the utmost care what *is*—in this case, to examine the various research programs in the relevant sciences with sufficient attention so as to discern how they really operate, what they take for granted, what they postulate, what they offer, and in the light of these observations to evaluate their claim to make a genuine contribution to understanding, and to do so by naturalistic means.

⁸ See Andler (2010), Williamson (2011).

At this point, then, liberal naturalism has opened up to mainstream human sciences—either by relaxing the rules of admission into the realm of natural entities and methods, or by giving them credit for their proven capacity to throw some light on the human sphere, or both. It has also resolved to apply the full force of impartial rationality to naturalistic programs. While facilitating collaboration between naturalistic and mainstream social science, these moves by themselves cannot bring about substantial synergies. The main reason is that naturalistic research, at the present stage, is essentially theoretical and laboratory-centered, while most mainstream human science is field-based, in the sense where it relies on real cases, be they drawn from historical archives, ethnographic or sociological observations, statistics on real populations or economies, accounts of individual or collective behaviors in actual situations, descriptions of past and present political and legal systems, etc. And there generally is no direct route from one area to the other: no question or puzzle raised by the field studies (in the extended sense just proposed) to which naturalistic theory can directly respond; and conversely, no issue in the field that naturalistic theory can be directly applied to. This disconnect is reminiscent of a well-identified situation regarding medicine in relation to human biology: to go from “bench” (the biology lab) to “bedside” (the patient) requires an intermediate phase—so-called translational research—during which vocabularies become partially aligned, questions reformulated, methods adjusted so as to ensure a fruitful two-way commerce whereby biology becomes responsive to questions arising in medicine it hadn’t envisaged before, and conversely medicine begins to look in directions suggested by biology that it has left unexplored. A similar process, I submit, will allow liberal naturalism to yield its full potential in the human sciences⁹.

⁹ I have refrained up until now from providing examples, due to space constraints and the risk of courting controversy. Here I make an exception, to deflect the charge of empty talk. In linguistics, Smolensky et al.’s theory of harmonic grammar is the outcome of in-depth translational research, allowing for the application of powerful computational ideas to real-life linguistic phenomena (Smolensky and Legendre 2005). In paleoanthropology, Sterelny’s theory of the emergence of social/cultural forms and advanced skills (Sterelny 2012) brings together rich field data and evolutionary cognitive science. In social psychology, Daniel Nettle and others have similarly brought to bear life history theory on phenomena identified by sociology (Nettle *et al.* 2013). These are examples, all very different, of programs moving back and forth between the laboratory and the field.

4. Why the human sciences cannot be fully naturalized

The brand of liberal naturalism that I advocate is critical in the everyday sense just made clear. It is also critical in the Kantian sense¹⁰: it embraces the thought that its empire is not boundless. It does so not from an abstract standpoint, or for the sake of saving some sacred value (such as resisting the disenchantment brought about, according to people on both sides, by naturalism), but by taking a hard look at the concrete level of scientific achievements and reflecting on their resources and their limitations.

The critical naturalist is not alone: non- and anti-naturalists are on the same page, or so it seems. The difference is that for the critical naturalist, the existence of limits does not discredit naturalism; to the contrary, it brings into focus what it can achieve. Moreover, the critical naturalist, instead of rejecting wholesale, from first principles, the naturalist perspective on recalcitrant phenomena, follows it as far as it goes. On the other hand, unlike the radical naturalist, he does not assume that all obstacles will eventually be cleared, just because, as the slogan goes, “there are no miracles”. Indeed: science has no miracle solution for every problem on the horizon, as the most cursory look at history shows again and again. Realism about science, in the everyday sense of the word, is part of the naturalistic stance: our scientific knowledge remains radically incomplete.

I will not pursue this train of thought, and instead will focus in the present (and last) section on an issue of direct relevance for the human sciences—at both the individual and collective levels, *viz.* behavior. Behavior may well be the most important, most salient target of the naturalistic human sciences. Despite the (exaggerated) reports of behaviorism’s demise, an overwhelming portion of cognitive science is couched, or can easily be translated in terms of behavior. Of particular relevance here is the large body of research combining the tools of decision and game theory with both evolutionary and neuro-psychological approaches of reasoning in order to construct models of agents’ behaviors in a large set of cases. These models operate either at the so-called ‘personal’ level, where the agent consciously follows certain norms and applies certain rules to the situation at hand; or at the ‘subpersonal’ level, where the agent’s decision is the outcome of neural processes operating according to certain constraints on informations gathered by the agent from various sources. These neural processes implement algorithms that lead to the actual decision, which on average leads in

¹⁰ The ‘critical’ label is used, here and elsewhere, as an ordinary epithet qualifying naturalism; I also use it for the brand of naturalism that I develop at length in Andler (2016).

turn, thanks to phylogenetic adaptation and ontogenetic learning, to the desired outcome—the agent’s mental flux, during the process, is explanatorily idle.

There is much to admire in, and learn from this line of work. It does however raise two crucial questions.

The first concerns normativity. The naturalist is correct in assuming that insofar as norms impinge on behavior, they do so because agents are disposed to abide by them: the disposition to respect a given norm is thus assumed to be on par with other natural dispositions, such as the dispositions to speak and understand one’s native language, to respond to threats in such and such a way, to imitate certain people, to go for sweet foods, to avoid stimuli that we find disgusting, etc. Norms however don’t impinge on behavior at all in the same way as these natural dispositions. They bind the agent while leaving it up to her to accept or ignore their injunctions. The normativity of norms is a puzzle for the naturalist, one which he is tempted to dissolve by denying its very existence. But as is invariably the case, elimination by fiat isn’t a stable solution. This is made clear in cases where the agent has a reason not to abide by a given norm, for example because another norm orients her towards a different decision: her deliberation is not about which of her dispositions will eventually win out, but about how she *should* adjudicate their divergent claims. As has been often remarked, there is no way of eliminating deontic concepts while describing normative events. The naturalist who insists that the agent is deluding herself, the victim of a massive error, does not have the last word.

This well-known debate, to which I have given short shrift, is however of limited import for the present discussion. It concerns an ontological issue, which leaves essentially intact a large part of the agenda of scientific naturalism. After all, if the present uncertainties regarding intentionality, consciousness or free will have not stopped it in its tracks, normativity shouldn’t either. The second issue is far more consequential, as it impacts the epistemological wing of naturalism.

Models of decision-making perforce envisage *types* of situations. They take as input the parameters of the situation, the goals of the agent, her subjective estimates of the outcomes of her various possible moves. The output is the decision that the agent should take in order to optimize her gain (prescriptive mode) or actually does take (descriptive mode). This very broad framework is easily adjusted so as to accommodate a large variety of decision procedures, whether automatic and subpersonal, such as those involved in linguistic understanding, or deliberative, such as those recruited in deliberate problem solving. Early artificial intelligence and cognitive science aimed for models for the latter kind: they meant to provide the answer to questions of the form “What is the intelligent agent to do in this

situation?”, an answer in the form of an algorithm. The project foundered when it hit the obstacle of context: however sophisticated, an algorithm can take into account no more than a predefined set of parameters, one attached to the *type* of situation it is built to deal with. Outside the laboratory, people deal not with a type of situation, nor even with a typical situation, but with a concrete, singular situation. Rules provided by the algorithm are not sufficient to dictate the proper response, which requires identifying and weighing the relevant features of this particular situation among the myriad potential ones. In fact, before the agent can apply the rules relative to the type of situation of which the situation at hand is a token, she must spot the relevant features and correlatively identify the situation at hand as one of a certain type.

There are two key points to consider at the present juncture. The first is that in many cases, there exists no context-identifying algorithm, yet people somehow manage: a lot of the time, they do “the right thing”. The second is that there is no verification procedure, no supreme umpire, for what makes their decision the “right” one: it is right insofar as it has survived a comparative cross-examination by the agent and her real or notional ideal witnesses, who put forth arguments and take into account in the fairest possible way all the objective elements in play, including the eventual success at solving the initial problem, if there is one in a sufficiently well-defined sense. This judgment is never final and can always be reversed.

The question then arises, of *how* does anyone do the right thing, absent an algorithm—a system of rules—that delivers it? The answer cannot lie in some yet unidentified procedure that works in all or most cases, to which the objection just raised against a system of rules would apply. Nor can the answer lie in the miracle of a supernatural intuitive faculty. The point is that in each case there is a perfectly natural process at work, although there is no known natural process that works in each or even most cases: the ‘miracle’ boils down to an inversion of quantifiers! This is no more of a mystery than the fact that, as Neurath remarked a long time ago¹¹, we have no *complete* physical theories of falling leaves or of forest fires, yet every episode of a leaf falling off a tree and every forest fire fall under the jurisdiction of the physical sciences, and moreover we can identify *constraints* on the possible trajectories of falling leaves and the possible unfolding of forest fires. What runs dry in such cases is not ontological naturalism, but epistemic naturalism.

¹¹ Neurath (1931/1983).

It may still be objected that quotidian experience, as well as the partial success of formal decision methods, whether abstract or deployed in artificial systems, provide empirical evidence for the existence of situations to which all this does not seem to apply. These are situations in which the context is neutralized, in the sense where it can be fully determined in advance, *i.e.* in fact eliminated *qua* context, absorbed in the set of parameters to be included in the assessment of the situation. In such cases the agent proceeds without hesitation, and there is no debate about the way to go. This is the limit case on a continuum stretching between full tractability and deep intractability. But though conceptually extreme, it is pragmatically central: thanks in part to biological evolution, and to a larger part to cultural evolution, institutional niche construction and social learning, people go about their daily labors without having to stop, again and again, to ponder about the situation at hand. Most of the time, the context problem is pre-solved.

However, equally confirmed by quotidian experience is the recurrence of situations in which the problem is humanly intractable, in the precise sense where there is no known tractable algorithmic procedure that determines the relevant features. In such cases, deliberation is a necessary but insufficient first step, and is followed by, yet doesn't simply entail, choice: the Aristotelian dyad (*bouleusis* / *proairesis*) is at work in epistemic reasoning as it is in ethical reasoning¹².

How does the existence of these situations impact the human sciences? The answer is straightforward, once it is granted that agents' reasons for choosing a course of action partially determine that course of action, which in turn affect the individuals' behavior and performances in the long run. Whether singly or cumulatively, individual decisions then affect the trajectories of and within societies. As in the case of falling leaves and forest fires, there are constraints on the paths that individuals and societies can take, which naturalistic methods are adept at uncovering. But within the cone of possible paths, the actual path followed and its differences from other possible paths are of the utmost importance to us. The human sciences thus comprise an essential idiothetic, descriptive component that is connected, but only partially, to the network of regularities and constraints brought to light by their naturalistic subdisciplines. What the liberal naturalist maintains, unlike the anti-naturalist, is that both components can and must co-exist, and that there is no fixed and fast boundary between them.

¹² The epistemic undecidability that I have been stressing is compounded by the ethical dimension of most actual situations to which no routine applies; how these two sources of indeterminacy combine and compound one another is a matter of the utmost importance that cannot be examined here. The central point is that indeterminacy arises, or would arise, even in the absence of ethical concerns.

This endpoint is hardly novel, in contrast with the sea change envisaged by strict naturalism. On large issues concerning the human sphere, calls for sea changes are a sign of philosophical hubris. The liberal naturalist, while welcoming the contribution of his radical colleagues, parts way with them at this juncture.

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